Unit 17 Denmore Industrial Estate, Denmore Road, Bridge of Don, Aberdeen AB23 8JW

User Manual
Tool Catcher
169-2017-HH0

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Revision History

Issue, Release Date	Description
Rev A, 16 Jun 08	Initial Issue
Rev B, 31 Jul 08	Item 13 and Protector in Parts List and Assembly Drawing

Safety

WARNING: Trapped air requires considerable time to compress and when it is compressed is highly dangerous. It has enough stored energy to separate parts with considerable force.

All pressure equipment has a particular pressure rating and care must be taken to ensure that no item is used in a situation that may cause its working pressure to be exceeded.

All personnel involved in pressure testing must be formally trained, competent and utilising the appropriate PPE.

Safe-Lok devices, where fitted, should be checked for positional security to avoid unnecessary movement of the collar

Ensure the identification band/plate is fitted and is displaying the correct information as per the Tag Sheet/Index

This equipment and the equipment it is attached to is heavy never position yourself below a suspended load

Figure 1: Tool Catcher Safety

1 Introduction

1.1 General

The IRIS tool catcher dispenses with the traditional collet style grapples, which are restricted in the range of fishing necks that can be caught, and instead introduces a unique array of shaped fingers that form a spring loaded iris that automatically adapts to suit any size of fishing neck.

This user manual serves as an introduction to the equipment and contains the relevant specifications, operation, planning and maintenance instructions, parts list and drawings.

1.2 Product Identification

Phuel products are identified by a unique serial number that facilitates full product traceability. Each product is supplied with a documentation pack that contains product certification and material/inspection reports. The serial number is always etched on the surface of the product but can sometimes be difficult to find or read after painting. A customer identification number is also included to allow the customer to track the asset in their system.

A stainless steel band secures the nameplate tag that is stamped with the information shown below. This tag should be located in the first instance to ensure that this manual refers to the correct equipment.

PHUEL OIL TOOLS LTD
DESCRIPTION & SIZE
CUSTOMER ID No
PHUEL ID No 06-XXX-XX
MWP & SERVICE
TEST DATE

2 Technical Specification

Part Number	169-2017-HH0
Connection	5 ¾'' Otis Type
Maximum Working Pressure	10,000 Psi
Test Pressure	15,000 Psi
Service	H2S
Weight	184 lbs/83.46 Kg
Overall Length (A)	30.97''/0.79M
Make Up Length (B)	24.85''/0.63M
Hydraulic Connection	½'' NPT
Maximum Hydraulic Pressure	3,000 psi Typically only 500 psi is required with no tool string weight Typically 1,000 psi is required with 1000 Kg of tool string weight

Table 1: Technical Data

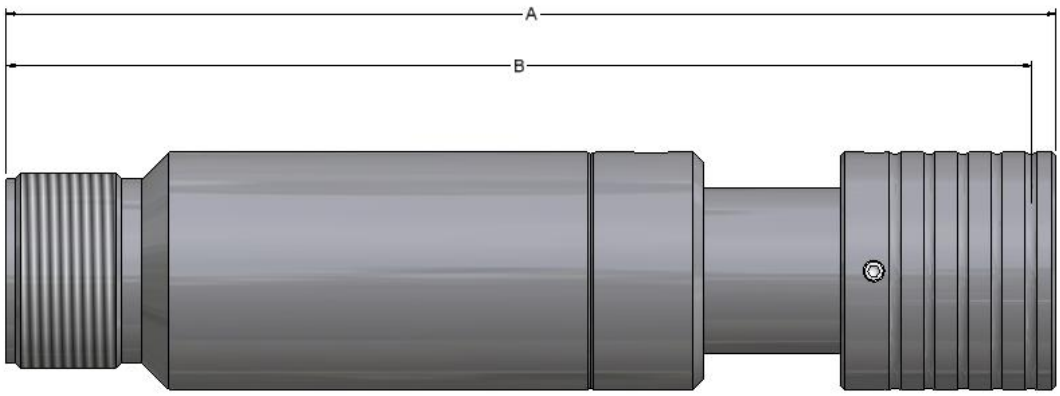


Figure 2: Tool Catcher

3 Technical Description

3.1 Description

The IRIS Tool Catcher is designed to prevent tool strings from falling downhole in the event of a breakage in the wire after the rope socket has struck the stuffing box. The unique IRIS fingers will catch in the recess of the fishing neck and lock the tool string in position. The Tool string can be released by applying hydraulic pressure to the piston to open the fingers – note that this will occur even with significant tool string weight so operators must guard against the dropping of the string when hydraulic pressure is applied.

There are twelve independent fingers mounted on a pivot joint that are spring closed. The upward movement of the tool string will naturally open the fingers against the spring, and they will then collapse into the recess below the fishing neck. When the tool direction is reversed the sharp angle at the base of the fishing neck prevents the fingers from opening allowing the whole tool string weight to be supported.

There is a second set of IRIS fingers mounted in the reverse direction and the top of the tool catcher. This group acts as a stop for the tool string to ensure that the lower set of fingers is correctly positioned to catch the fishing neck upset. The upper set is also mounted on a shock absorber so that any upward momentum is dissipated with minimum shock loading to the wire and the tool string. The fact that we are using IRIS fingers as an upward stop has the additional benefit that the tool string can now be loaded through the tool catcher from the top, which greatly simplifies the set up operation. Note that the tool string cannot be withdrawn from the top unless the top set of fingers are being held open with a suitable tubular sleeve (not supplied).

The Tool catcher is moved into the release position by applying hydraulic pressure to the piston, which will move upwards and force the fingers into the open position. With the piston fully extended the fingers are open to allow full bore access to the tool string.

Note: The second set of iris fingers can be removed and replaced with a spacer ring (supplied) if a longer fish neck is to be used. Care must be taken that the fingers can only catch in the correct recess when the tool strings stops and the top of the riser.

3.2 Tool String Insertion

- Ensue tool catcher set up for correct length of fish neck
- Visually check both sets of fingers are closed

- Attach hydraulic hand pump to ½'' NPT fitting and apply pressure to open the bottom set of fingers

- Insert tool string allowing it to pass through both sets of fingers

- Release pressure allowing the fingers to close
- Remove hand pump

3.3 Withdrawal of Tool String (Catching)

Tool string withdrawn from well

As tool approaches iris fingers they automatically open allowing tool to pass

Once wider part of tool passes through iris the fingers close to the size of the tool neck
Upper set of fingers act as a buffer to prevent tool from being totally withdrawn from the catcher

With tension released on the tool string the tool drops and rests on the iris fingers

Note: if a longer fish neck is used the upper set of fingers are not fitted and therefore the tool can be withdrawn from the top catcher when rigging down.

3.4 Long Fishing Neck Configuration

The Tool Catcher can be configured for long fishing necks by removing the upper finger set. Follow this procedure to re-configure the assembly for this purpose

- Split the top and bottom sub connection and remove the top sub
- Remove the spacer tube, finger assembly and shock absorber from the top sub
- Fit the spacer ring at the bottom of the top sub bore then the spacer tube
- Ensure that the finger seal sub is still fully made up to the bottom sub as this connection may have backed off when removing the top sub
- Verify that the ‘O’ ring (12) is still in good condition – replace if required
- Make up the top sub again taking care not to dislodge the parts inside it
- Feel from the top end that the parts inside are held together correctly
- Open and close the fingers to ensure that they are operating correctly

Note – When ever the top sub is removed check that the seal sub has not backed off before re-assembling.

4 Operation

All operations to be carried out by suitably qualified and competent personnel

4.1 Setting Up

- Position the tool catcher at the top of the riser stack immediately below the stuffing box, grease head or Turnaround Sheave (see note below)
- Remove protector to allow fitment of ½" NPT connector
- Attach a hydraulic hose to the ½" NPT port using a suitable adapter – secure the hose to the riser to prevent trapping when lifting
- Refit protector
- Apply pressure to the tool catcher to open the fingers. If possible look in the bore to confirm that the fingers are opening. Bleed off and confirm that they are closing again fully.
- Make up the rest of the riser stack as normal

4.2 Inserting the Tool String

- Apply pressure to the port to open the fingers and insert the tool string – remember it will not be possible to withdraw the tool string again as the upper fingers will catch in the recesses between the tool sections*.
- When the rope socket (or cable head) is reached push it beyond the lower finger set and then bleed off the hydraulic pressure to release the fingers. Pull the string back against the upper finger set to lock the rope socket in the catcher.

  *Alternatively the string can be inserted from below the catcher by feeding only the cable head through the catcher then making up the string to the cable head and then pulling back into the catcher. Either method is acceptable

4.3 Operating (Catching)

- The Catcher is automatically set at ready to catch if no pressure is applied to the hydraulic port and there is no fishing neck in the Catcher. Pull the tool string upwards until the rope socket tags against the top set of fingers and the slack off the weight and the fingers will now support the tool string

4.4 Operating (Releasing)

- Take the weight of the tool string and lift up until the rope socket tags the upper set of fingers

- Apply pressure to the tool catcher to open the fingers
- Slowly lower the tool string to make sure that the fingers have fully retracted and have cleared the tool string
- Bleed off the pressure to set the catcher ready to catch again.

4.5 Pre Job

- Ensure thread protectors are fitted
- Check maintenance record sheet and ensure the equipment has been maintained by competent personnel
- Check all certification is in date
- Confirm information band is fitted and correct
- Ensure equipment is suitable for the maximum working pressures and services involved
- Ensure ‘O’ ring is seated correctly and there are no signs of damage
- Ensure threads are clean
- Inspect for signs of damage
- Pressure test to 1.2x the maximum well pressure
- Ensure all connections are tight
- Ensure that spare o-rings are available and sent with the equipment.
- Ensure set up for correct size tool fish neck

4.6 During Job

- Avoid excessive movement
- Ensure that the pressure to the hydraulic port is bled off when ready to catch

4.7 Post Job

- Inspect for signs of damage and report any findings
- Ensure threads are cleaned and the re-greased
- Ensure thread protectors are fitted

5 Maintenance

All maintenance to be carried out by suitably qualified and competent personnel

5.1 Introduction

Regular maintenance of the equipment using Phuel redress kits or Phuel approved parts is essential to its continued safe operation. Ensure that the pre and post job operating procedures are followed and that maintenance records are kept.

5.2 Schedule

The maintenance schedule may be governed by international or company standards and the following is considered to be the minimum requirements.

5.2.1 Pre & Post Job

Refer to Section 4 and Section 4.7 for details

5.2.2 Yearly

- Disassemble , clean and degrease all components
- Inspect the condition of all sealing surfaces and surface coatings
- Re-coat threads and sealing surfaces if necessary. If in doubt contact Phuel Oil Tools Ltd
- Replace all elastomeric seals with items from redress kit (Table 4)
- Re-grease components
- Re-assemble (5.5.2)
- Pressure test to maximum working pressure
- Inspect paint work and repair as necessary

5.2.3 Five Yearly

- Yearly Maintenance (plus the following)
- Carry out 100% surface NDE on all surfaces
- Pressure test to test pressure witnessed by certifying authority

5.3 Safety

- Many of the components are heavy and should not be lifted without lifting aids
- Wear appropriate personal protective equipment
- Do not over exert yourself while using torque wrenches. Use appropriate mechanical advantages when available.

- Ensure that all tools and equipment are in good condition and are suitable for the intended use.

5.4 Tools

The following tools are required:

- Memac Chain Wrench (No2 with 14'' chain)
  Other pipe wrenches may be used but will mark equipment
- 3/8 hex Allen key
- 7/8'' Spanner (If NPT plug to be fitted)
- Wire brush

5.5 Redress Procedure

5.5.1 Dis-Assembly

- Remove 4 screws and washers, loosen and remove the split ring and remove the collar from the bottom sub
- Split the top and bottom sub
- Remove the spacer spring, finger assembly and shock absorber from the top sub
- Remove the finger seal sub, compression spring and piston from the bottom sub
- Remove and discard the 'O' rings from the 2 finger assemblies, remove the finger support rings and the fingers
- Remove all other 'O' rings and 'T' seals and discard
- Degrease and clean all components

5.5.2 Re-Assembly

- Remove thread protectors
- Fit 'O' rings to the bottom sub and finger seal sub
- Fit 'T' seals to the bottom sub, piston and finger seal sub
- Grease piston and bottom sub 'T' seals
- Fit piston to bottom sub
- Arrange 12 fingers around the finger seal sub
- Fit finger support ring and 'O' ring (ensure fingers operate)
- Place compression spring over piston
- Grease finger seal sub 'O' ring and 'T' seal and fully fit to bottom sub
- Arrange remaining 12 fingers around the finger hub
- Fit finger support ring and 'O' ring (ensure fingers operate)
- Fit shock absorber, finger assembly and spacer spring into the top sub
- Make up top and bottom sub (see note below)
- Place collar over the bottom sub, attach the split ring and tighten until flush. Back off slightly and secure with 4 screws and washers.

Note: if longer fish neck is to be used fit the spacer ring into the top sub in place of the finger assembly and shock absorber.

5.6 Maintenance Record Sheet

Date Performed	Type of Maintenance	Performed By	Verified By	Comments

Table 2: Maintenance Record

6 Testing

All testing is to be carried out in the designated test area and by suitably qualified and competent personnel.

WARNING: Trapped air requires considerable time to compress and when it is compressed is highly dangerous. It has enough stored energy to separate parts with considerable force.

- Fit appropriate test cap and blanks
- Fill with testing fluid bleeding off any air within the system
- Apply a pressure of 500 psi and ensure pressure holds for a minimum of 10 minutes
- Increase pressure to 10,000 psi (Maximum Working Pressure), allow to stabilise, and maintain this pressure until it is evident there are no apparent leaks. (Testing to be carried out to Test pressure when decreed by maintenance schedule)
- Bleed off pressure, drain test fluid and dry
- Remove test caps
- Apply coating of de-watering solution to protect the bore and threads
- Fit thread protectors

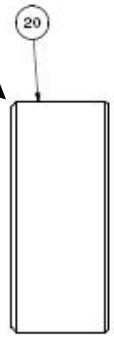
On completion of all maintenance ensure the maintenance record sheet (Para 5.6) is completed

7 Parts List and Drawings

Item Number	Part Number	Quantity	Description
1	169-1989-480	1	TOP SUB
2	169-2146-480	1	BOTTOM SUB
3	169-1991-480	1	FINGER SEAL SUB
4	169-1992-480	2	FINGER SUPPORT RING
5	169-1993-480	1	FINGER HUB
6	169-2147-480	1	PISTON
7	169-1995-480	1	SPLIT COLLAR
8	169-1996-480	1	SPLIT RING
9	169-2001-PU9	1	SHOCK ABSORBER
10	169-2016-4SS	24	CATCH FINGER
11	801-0342-H90	1	O-Ring - B.S Size 342
12	801-0356-H90	1	O-Ring - B.S Size 356
13	169-2325-316	1	SPACER SPRING
14	169-2048-STL	1	COMPRESSION SPRING
15	802-2101-H70	2	ROD T-SEAL (3.700)
16	802-2148-H70	1	T-SEAL PISTON (4.700)
17	801-0151-V70	2	O-Ring - B.S Size 151
18	SHC-0543-HTS	4	Soc Hd Cap Size 3/8 UNC x 0.625 in
19	WNL-540-STL	4	Nordlock Washer Size M10
20	169-2202-PU9	1	SPACER RING
21	169-2337-N66	1	TOOLCATCHER PROTECTOR
22	169-2378-304	2	SOC HD CAP M6X1.0 X 50mm LONG

Table 3: Parts List

Spacer Ring (20) supplied as a replacement for items 4 and 5 if required for use with a longer fish neck



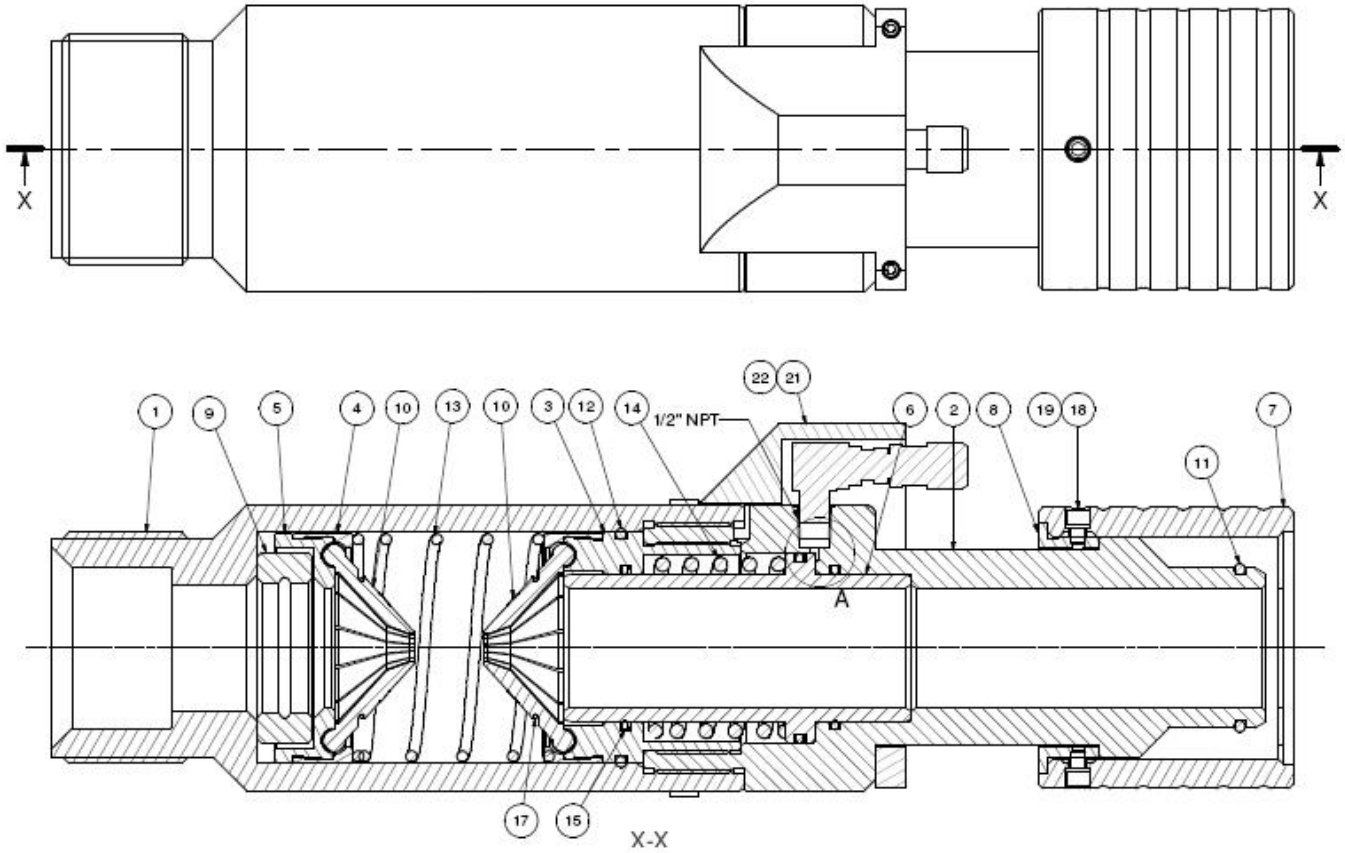


Figure 3: Tool Catcher Assembly (using 2 sets of fingers)

8 Spares

Use only spares supplied or approved by Phuel Oil Tools Ltd.

It is recommended that sufficient quantities of the following spares be maintained to ensure that the equipment is always available when required.

Elastomeric spares are supplied in HNBR material as standard. Many other materials are available please specify when ordering.

Part No	Qty	Description	Comments
801-0342-H90	1	O-Ring - B.S Size 342	
801-0356-H90	1	O-Ring - B.S Size 356	
802-2101-H70	2	ROD T-SEAL (3.700)	
802-2148-H70	1	T-SEAL PISTON (4.700)	
801-0151-H70	2	O-Ring - B.S Size 151	

Table 4: Redress Kit Part No RDK-2017-HH0

8.1.1 Individual Items

Individual items may be ordered as required using the part number specified

Note: O-Rings conform to industry standards and may be substituted with those from other suppliers -– **at the sole risk of the user**.